

I CLAIM:

1. A method of forming a programmable conductor memory cell comprising:
forming a cathode;
forming a glass electrolyte element in isolation from other active areas and in contact with the cathode;
forming an insulating layer over the glass electrolyte element;
forming an anode via in the insulating layer, thereby exposing a surface of the glass electrolyte element;
depositing a layer of spacer material that conforms to contours of the anode via and the insulating layer;
preferentially etching horizontal portions of the spacer material to expose a central portion of the surface of the glass electrolyte element; and
depositing a layer of conducting material sufficiently thick to fill the anode via and to provide a conducting layer over the insulating layer, thus forming an anode.
2. The method of Claim 1, wherein forming the glass electrolyte element comprises forming a germanium-selenium glass and introducing silver ions into the glass by deposition of a silver layer over the glass and subsequently diffusing silver from the silver layer into the glass.
3. The method of Claim 2, wherein diffusing silver into the glass comprises photodissolution.
4. The method of Claim 1, wherein forming the glass electrolyte element comprises forming a first germanium selenide layer, an intervening metal selenide layer over the first germanium selenide layer, and a second germanium selenide layer over the intervening metal selenide layer.
5. The method of Claim 1, wherein forming the insulating layer comprises depositing silicon nitride.
6. The method of Claim 1, wherein the anode via is formed to a width between about 200 nm and 300 nm.
7. The method of Claim 1, wherein depositing the layer of spacer material comprises depositing a layer of insulating material.

8. The method of Claim 7, wherein depositing the layer of spacer material comprises depositing a layer of silicon nitride.
9. The method of Claim 8, wherein the layer of spacer material is deposited to a thickness between about 5 nm and 30 nm.
10. The method of Claim 1, wherein preferentially etching comprises reactive ion etching.
11. The method of Claim 1, wherein depositing a layer of conducting material comprises depositing silver.
12. A method of forming a programmable conductor memory cell comprising:
 - forming a cathode;
 - forming a glass electrolyte element in isolation from other active areas and in contact with the cathode;
 - forming an insulating layer over the glass electrolyte element;
 - forming an opening in the insulating layer, to expose a surface of the glass electrolyte element; and
 - depositing a layer of conducting material into the opening to contact only the central portion of the surface of the glass electrolyte element, thus forming an anode.
13. The method of Claim 12, wherein forming the opening comprises:
 - etching a via through the insulating layer;
 - blanket depositing a spacer material layer; and
 - preferentially etching horizontal portions of the spacer material layer to expose the central portion of the surface of the glass electrolyte element.
14. The method of Claim 13, wherein the spacer material comprises an insulating material.
15. The method of Claim 12, wherein the insulating material is silicon nitride.
16. The method of Claim 12, wherein forming the opening in the insulating layer comprises patterning and etching using a mask with an opening smaller in width than the glass electrolyte element and having the opening arranged concentrically over the glass electrolyte element.